

CPUC Workshop Senate Bill 1371

**California Air Resources Board
Oil and Gas Emissions and Mitigation**

April 6, 2015

Outline

- AB 32 Background
 - History of ARB work in NG Transmission and Distribution
- Short Lived Climate Pollutant Plan
 - Covers additional reductions in methane
- Oil and Gas Production, Processing, Storage, and Compressor Station Regulation
 - Inclusion of Transmission and Distribution Sources
- Natural Gas Transmission and Distribution Emissions and Mitigation
- Potential options to reduce fugitive greenhouse gases
- Current and upcoming activities at ARB

The Global Warming Solutions Act of 2006 (AB 32)

- Scoping Plan for GHG emission reductions
 - Maximum technologically feasible
 - Cost-effective
 - Real, permanent, quantifiable, verifiable, and enforceable
- Original Plan identified two Oil and Gas sector measures
 - Oil and Gas Production, Processing, and Storage; and
 - Natural Gas Transmission and Distribution (NG T&D)
- Working as partners with CPUC to provide emissions and mitigation knowledge to shape final regulation.
 - NG T&D measure analysis to date

Short Lived Climate Pollutant (SLCP) Plan

- Includes methane, black carbon, and HFCs
- Draft Plan to Board by end of year
- Survey results: Emissions are about 5 MMTCO₂e
- Work ongoing to incorporate survey into ARB GHG inventory estimates
- Plan will consider significant methane reductions

The Natural Gas Production Industry

Oil and Gas

Natural gas systems encompass wells, gas gathering and processing facilities, storage, and transmission and distribution pipelines.

● Production & Processing

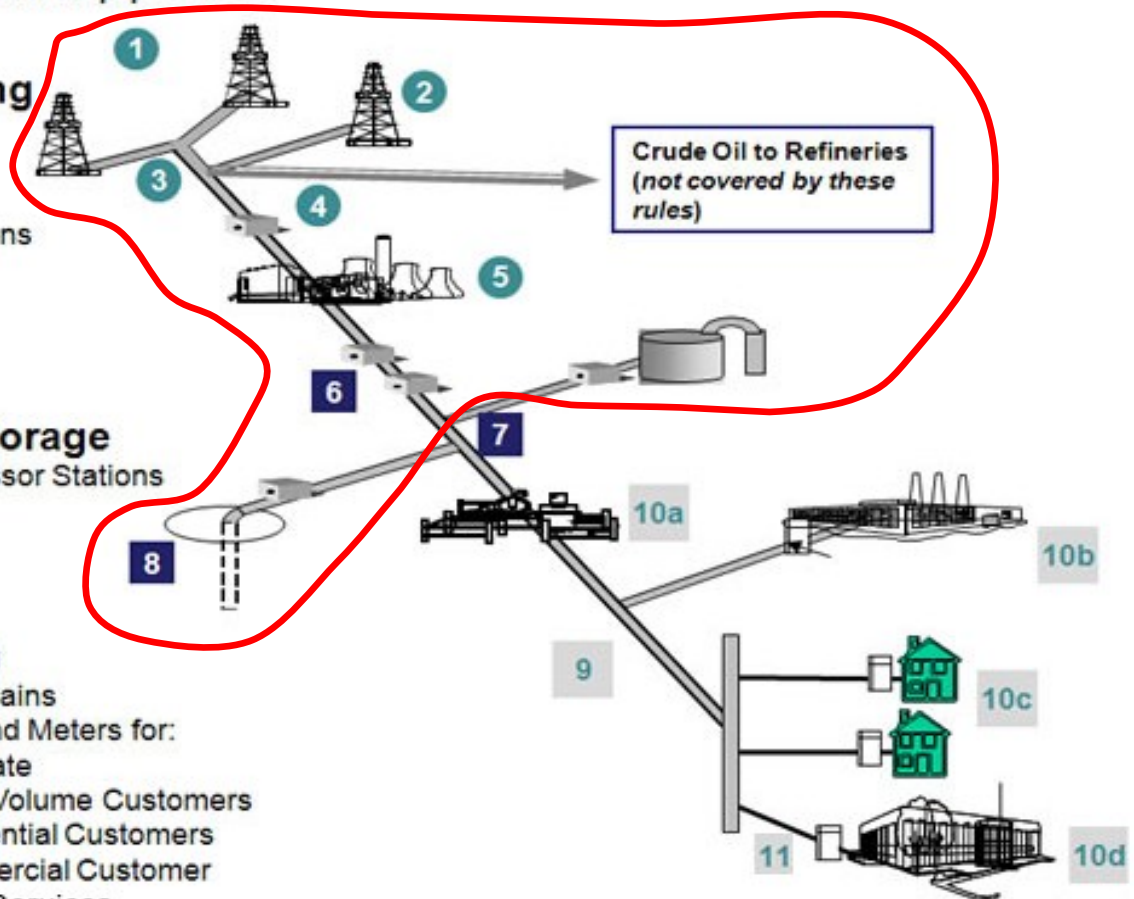
1. Drilling and Well Completion
2. Producing Wells
3. Gathering Lines
4. Gathering and Boosting Stations
5. Gas Processing Plant

■ Natural Gas Transmission & Storage

6. Transmission Compressor Stations
7. Transmission Pipeline
8. Underground Storage

■ Distribution

9. Distribution Mains
10. Regulators and Meters for:
 - a. City Gate
 - b. Large Volume Customers
 - c. Residential Customers
 - d. Commercial Customer
11. Distribution Services



Source: Adapted from American Gas Association and EPA Natural Gas STAR Program

Oil and Gas Regulation – T&D related coverage

Greenhouse Gas Emission Controls from Crude Oil and Natural Gas Operations

- Covers oil and gas production, processing, **storage, and transmission compressor stations**
- Two workshops completed
- Third workshop tentatively planned for late April
 - Draft regulatory language
- Board Hearing tentatively in September

Oil and Gas Proposal

- Establishes emissions limits and control technology requirements
 - separator and **tank systems**,
 - well stimulation treatment,
 - **natural gas compressors**,
 - **pneumatic devices and pumps**,
 - liquids unloading of gas wells,
 - **Leak Detection and Repair (LDAR)**.
- Draft regulatory language expected in late April
 - Proposal may change based on stakeholder input

Oil and Gas Proposal

Components most relevant to T&D

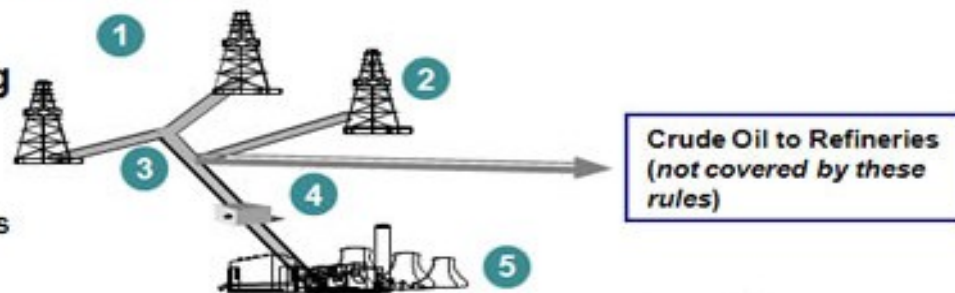
- Current Proposal for compressors
 - Reciprocating: change seals based on time/usage or route vent gas
 - Centrifugal: use dry seals or route gas
 - Considering alternatives that have been submitted
- Current proposal for tanks
 - Flash testing required
 - If above standard must install vapor recovery
- Pneumatics (storage and compressors) and LDAR (storage)

The Natural Gas Production Industry Transmission & Distribution

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Production & Processing

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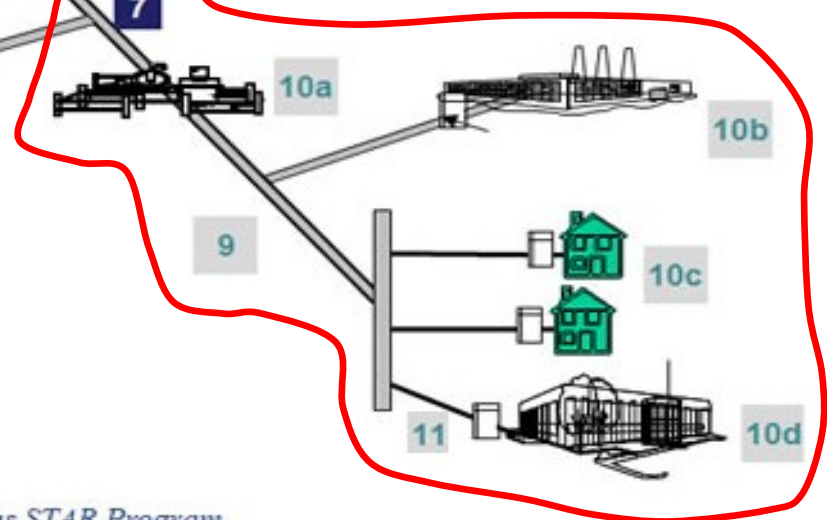
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Natural Gas T&D 2009 Survey of 2007 Activity Data

- Collected detailed activity data specific to California
- Included fugitive, vented, and combustion sources
- Focused on fugitive and vented emissions
- Received 100% response from natural gas entities

2007 Snapshot of Natural Gas T&D Activities

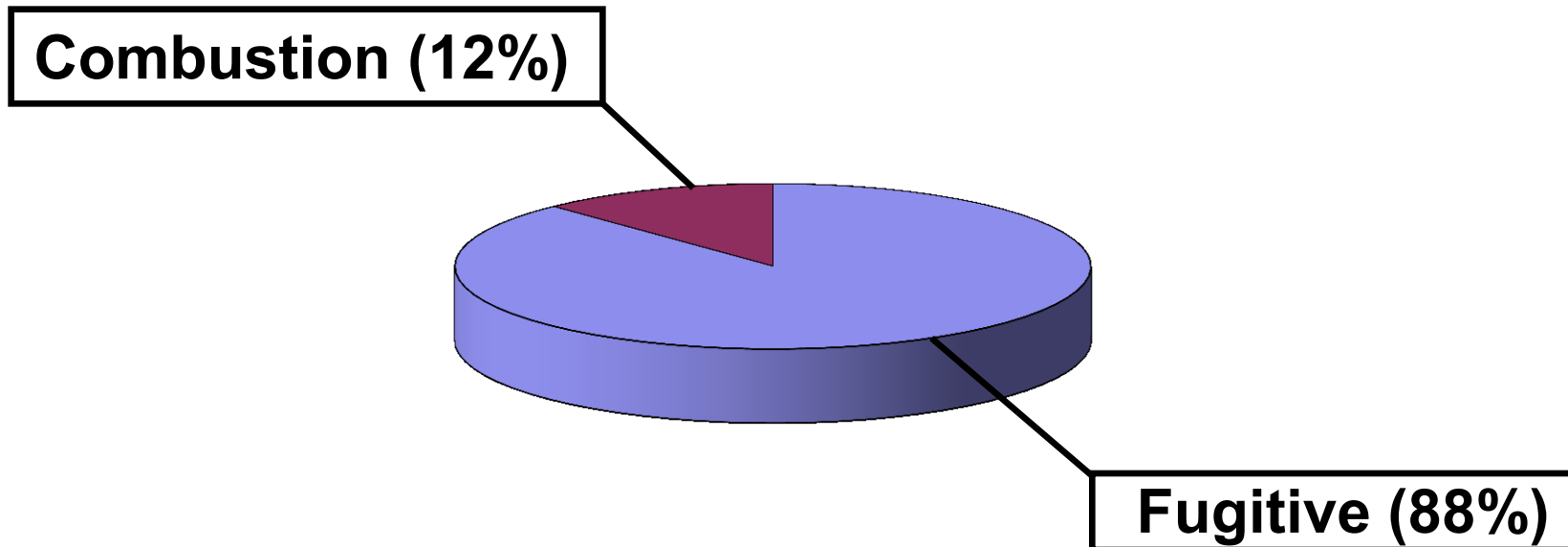
- Transported about 2.2 trillion-standard-cubic-feet of natural gas
- Used over 13,000 miles of transmission and 200,000 miles of distribution pipelines
- Served about 10.5 million industrial, commercial, and residential customers

Emissions Calculation Methodology

- GHG Emissions Inventory =
 $\Sigma (\text{Activity Data} * \text{Emission Factors} * \text{GWP})$
↓ ↓ ↓
- Survey - INGAA, AGA - IPCC
↓
- GRI/EPA study

Preliminary 2007 Survey Results

**Total GHG Emissions
(4.5 MMTCO₂e, AR4)**



Total Fugitive Emissions

Natural Gas T&D Survey

Fugitive Source	Activity	Emissions* (MMTCO₂e)
Pipelines	210,000+ miles	3.0
M&R Stations	15,000 stations	0.6
Comp. Stations	28 stations	0.3
Others		0.1
T o t a l		4.0

* Estimated using IPCC Fourth Assessment GWP

Transmission and Distribution Pipeline Emissions

Pipeline	Miles	Estimated Emissions (MMTCO ₂ e)*		
		AR4 (100 Yr)	AR5 (100 Yr)	AR5 (20 Yr)
Transmission	10,000 ⁺	0.15	0.20	0.52
Distribution	200,000 ⁺	2.82	3.84	9.70
Total		~3.0	~4.0	~10.2

*Include emissions from customer meters, dig-in, and venting.

Mandatory Reporting Regulation (MRR)

- ARB will be updating inventory based on MRR and survey results
- Utilities report annually if emissions greater than or equal to 25,000 MTCO₂e.
 - Threshold based on combustion, process, fugitive and vented emissions
- New sources added, reporting 2014 data and beyond
 - Customer meters
 - Pipeline dig-ins

Additional Efforts to Improve Estimates

- Contract with GTI to develop CA-specific emission factors
 - Access to CA emission data from other GTI contracts
- Includes main and service distribution pipelines
 - Above & below ground leak measurements
 - Facilitated by PG&E, SoCalGas, and SDG&E
 - Visited more than 15 cities
 - Need more below ground measurements
- CA specific EFs could be used for estimates if deemed robust and appropriate
- Contract ends Dec 2015
- New studies to examine, including CA specific measurements

Potential Options to Reduce Fugitive Emissions

- Reduce methane leaks and venting
 - Utilize new leak detection tools
 - Install cost-effective technologies
 - Implement pipeline cross-compression to reduce venting
- Implement best management practices
 - Practice enhanced directed I&M
- Replace pipelines
 - Based on material or other parameters
 - Based on historical patterns of leaks
- Compressor stations covered in oil and gas regulation
- Pneumatic devices outside compressor stations:
 - Low-bleed (6 scfh), no bleed, or gas capture
- Require measurements of leaks when repaired to better analyze and target in future

Next Steps

- Analyze incoming data
 - Most recent MRR data
 - GTI, Argonne and WSU Studies
 - Utility data request
- Finish and potentially expand field measurements
- Plan to submit upstream Oil & Gas proposal to Board tentatively in September 2015
- Coordinate with CPUC
 - Work as partners on emissions, mitigation and rule development

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Visit NG T&D website at: <http://www.arb.ca.gov/cc/gas-trans/gas-trans.htm>

Discussion

Questions or Comments?